WHAT IS CLAIMED IS:

1. A plasma processing method for plasma processing a specimen by a plasma processing apparatus including a plasma generating unit, a process chamber capable of having an inside pressure thereof reduced, wherein the process chamber includes an outer cylinder having the capability of withstanding a reduced pressure, and an inner cylinder arranged inside the outer cylinder and a process gas supply unit for supplying a gas to the process chamber, a specimen table for holding a specimen, a vacuum pumping unit, and a monitor unit, the method comprising the step of:

detecting a temperature of the inner cylinder of the process chamber utilizing the monitor unit to one of continuously monitor the inner cylinder temperature and optionally monitor the inner cylinder temperature at a time of plasma processing of a specimen.

2. A plasma processing method according to claim 1, further comprising the step of setting in advance a temperature of the inner cylinder corresponding to a plasma processing condition for the specimen.

3. A plasma processing method for plasma processing a specimen by a plasma processing apparatus including a plasma generating unit, a process chamber capable of having an inside pressure thereof reduced, wherein the process chamber includes an outer cylinder having the capability of withstanding a reduced pressure, and an inner cylinder arranged inside the outer cylinder and a process gas supply unit for supplying a gas to the process chamber, a specimen table for holding a specimen, a vacuum pumping unit, and a monitor unit, the method comprising the steps of:

processing a plurality of specimens one by one in a continuous manner;

detecting a temperature of the inner cylinder; and

continuously monitoring the temperature of the inner cylinder for every one of the plurality of specimens until completion of processing thereof.

4. A plasma processing method according to claim 3, further comprising the step of setting in advance a temperature of the inner cylinder corresponding to a plasma processing condition for the specimen.

5. A plasma processing method for plasma processing a specimen by a plasma processing apparatus including a plasma generating unit, a process chamber capable of having an inside pressure thereof reduced, wherein the process chamber includes an outer cylinder having the capability of withstanding a reduced pressure, and an inner cylinder arranged inside the outer cylinder and a process gas supply unit for supplying a gas to the process chamber, a specimen table for holding a specimen, a vacuum pumping unit, and a monitor unit, the method comprising the step of:

monitoring of a temperature of the inner cylinder at a time of plasma processing of the specimen so as to obtain a history of the specimen up to an interruption of plasma processing for the specimen which is checkable.

6. A plasma processing method according to claim 5, further comprising the step of setting in advance a temperature of the inner cylinder corresponding to a plasma processing condition for the specimen.

7. A plasma processing method for plasma processing a specimen by a plasma processing apparatus including a plasma generating unit, a process chamber capable of having an inside pressure thereof reduced, wherein the process chamber includes an outer cylinder having the capability of withstanding a reduced pressure, and

an inner cylinder arranged inside the outer cylinder and a process gas supply unit for supplying a gas to the process chamber, a specimen table for holding a specimen, a vacuum pumping unit, and a monitor unit, the method comprising the step of:

monitoring of a temperature of the inner cylinder during a seasoning operation in the process chamber so as to detect the temperature of the inner cylinder when the seasoning operation is carried out in the process chamber.

8. A plasma processing method according to claim 7, further comprising the step of setting in advance a temperature of the inner cylinder corresponding to a plasma processing condition for the specimen.

9. A plasma processing method for plasma processing a specimen by a plasma processing apparatus including a plasma generating unit, a process chamber capable of having an inside pressure thereof reduced, wherein the process chamber includes an outer cylinder having the capability of withstanding a reduced pressure, and an inner cylinder arranged inside the outer cylinder and a process gas supply unit for supplying a gas to the process chamber, a specimen table for holding a specimen, a vacuum pumping unit, and a monitor unit, the method comprising the step of:

monitoring of a temperature of the inner cylinder one of before starting the plasma processing of the specimen and after finishing cleaning operation so as to detect the temperature of the inner cylinder.

10. A plasma processing method according to claim 9, further comprising the step of setting in advance a temperature of the inner cylinder corresponding to a plasma processing condition for the specimen.

11. A plasma processing method for plasma processing a specimen by a plasma processing apparatus including a plasma generating unit, a process chamber capable of having an inside pressure thereof reduced, wherein the process chamber includes an outer cylinder having the capability of withstanding a reduced pressure, and an inner cylinder arranged inside the outer cylinder and a process gas supply unit for supplying a gas to the process chamber, a specimen table for holding a specimen, a vacuum pumping unit, and a monitor unit, the method comprising the steps of:

performing a cleaning operation in the process chamber under utilization of plasma for gas for cleaning at least one of before plasma processing of the specimen, during the plasma processing for a plurality of specimens, and after the plasma processing of the specimen; and

monitoring a temperature of the inner cylinder after the cleaning operation and before starting the plasma processing for the specimen so as to detect the temperature of the inner cylinder.

12. A plasma processing method according to claim 11, further comprising the step of setting in advance a temperature of the inner cylinder corresponding to a plasma processing condition for the specimen.

13. A plasma processing method for plasma processing a specimen by a plasma processing apparatus including a plasma generating unit, a process chamber capable of having an inside pressure thereof reduced, wherein the process chamber includes an outer cylinder having the capability of withstanding a reduced pressure, and an inner cylinder arranged inside the outer cylinder and a process gas supply unit for supplying a gas to the process chamber, a specimen table for holding a specimen, a vacuum pumping unit, and a monitor unit, the method comprising the steps of:

monitoring a temperature of the inner cylinder; and

interrupting plasma processing for the specimen in response to the monitored inner cylinder temperature.

14. A plasma processing method according to claim 13, further comprising the step of setting in advance a temperature of the inner cylinder corresponding to a plasma processing condition for the specimen.

15. A plasma processing method for plasma processing a specimen by a plasma processing apparatus including a plasma generating unit, a process chamber capable of having an inside pressure thereof reduced, wherein the process chamber includes an outer cylinder having the capability of withstanding a reduced pressure, and an inner cylinder arranged inside the outer cylinder and a process gas supply unit for supplying a gas to the process chamber, a specimen table for holding a specimen, a vacuum pumping unit, and a monitor unit, the method comprising the steps of:

performing a cleaning operation in the process chamber under utilization of a plasma for gas for cleaning during processing of a plurality of specimens when the plural specimens are processed one by one in a continuous manner; and

monitoring a temperature of the inner cylinder after the cleaning operation and before starting of the plasma processing for the specimen.

16. A plasma processing method according to claim 15, further comprising the step of setting in advance a temperature of the inner cylinder corresponding to a plasma processing condition for the specimen.

17. A plasma processing method for plasma processing a specimen by a plasma processing apparatus including a plasma generating unit, a process chamber capable of having an inside pressure thereof reduced, wherein the process chamber includes an outer cylinder having the capability of withstanding a reduced pressure, and an inner cylinder arranged inside the outer cylinder and a process gas supply unit for supplying a gas to the process chamber, a specimen table for holding a specimen, a vacuum pumping unit, and a monitor unit, the method comprising the steps of:

monitoring a temperature of the inner cylinder; and

generating an alarm in response to the monitored temperature.

18. A plasma processing method according to claim 17, further comprising the step of setting in advance a temperature of the inner cylinder corresponding to a plasma processing condition for the specimen.

19. A plasma processing method for plasma processing a specimen by a plasma processing apparatus including a plasma generating unit, a process chamber capable of having an inside pressure thereof reduced, a process gas supply unit for supplying a gas to the process chamber, a specimen table for holding a specimen, a vacuum pumping unit and a monitor unit, the method comprising the step of:

detecting a temperature of an inner wall of the process chamber utilizing the monitor unit so as to one of continuously monitor the inner wall temperature and optionally monitor the inner cylinder temperature at a time of plasma processing of a specimen.

20. A plasma processing method for plasma processing a specimen by a plasma processing apparatus according to claim 19, further comprising the step of

setting in advance a temperature of the inner wall corresponding to a plasma processing condition for the specimen.

21. A plasma processing method for plasma processing a specimen by a plasma processing apparatus including a plasma generating unit, a process chamber capable of having an inside pressure thereof reduced, a process gas supply unit for supplying a gas to the process chamber, a specimen table for holding a specimen, a vacuum pumping unit and a monitor unit, the method comprising the steps of:

processing a plurality of specimens in the process chamber one by one in a continuous manner; and

monitoring a temperature of an inner wall of the process chamber as the plurality of specimens are processed one by one in a continuous manner until the processing for the plurality specimens is completed so as to detect the temperature of the inner wall.

22. A plasma processing method for plasma processing a specimen by a plasma processing apparatus according to claim 21, further comprising the step of setting in advance a temperature of the inner wall corresponding to a plasma processing condition for the specimen.

23. A plasma processing method for plasma processing a specimen by a plasma processing apparatus including a plasma generating unit, a process chamber capable of having an inside pressure thereof reduced, a process gas supply unit for supplying a gas to the process chamber, a specimen table for holding a specimen, a vacuum pumping unit and a monitor unit, the method comprising the step of:

monitoring of a temperature of an inner wall at a time of plasma processing of the specimen so as to obtain a history up to an interruption of the plasma processing for the specimen which is checkable.

24. A plasma processing method for plasma processing a specimen by a plasma processing apparatus according to claim 23, further comprising the step of setting in advance a temperature of the inner wall corresponding to a plasma processing condition for the specimen.

25. A plasma processing method for plasma processing a specimen by a plasma processing apparatus including a plasma generating unit, a process chamber capable of having an inside pressure thereof reduced, a process gas supply unit for supplying a gas to the process chamber, a specimen table for holding a specimen, a vacuum pumping unit and a monitor unit, the method comprising the step of:

monitoring of a temperature of an inner wall during a seasoning operation in the process chamber so as to detect the temperature of the inner wall when the seasoning operation is carried out in the process chamber.

26. A plasma processing method for plasma processing a specimen by a plasma processing apparatus according to claim 25, further comprising the step of setting in advance a temperature of the inner wall corresponding to a plasma processing condition for the specimen.

27. A plasma processing method for plasma processing a specimen by a plasma processing apparatus including a plasma generating unit, a process chamber capable of having an inside pressure thereof reduced, a process gas supply unit for

supplying a gas to the process chamber, a specimen table for holding a specimen, a vacuum pumping unit and a monitor unit, the method comprising the step of:

monitoring of a temperature of an inner wall of the process chamber one of before starting plasma processing of the specimen or after finishing of a cleaning operation in the process chamber so as to detect the temperature of the inner wall.

28. A plasma processing method for plasma processing a specimen by a plasma processing apparatus according to claim 27, further comprising the step of setting in advance a temperature of the inner wall corresponding to a plasma processing condition for the specimen.

29. A plasma processing method for plasma processing a specimen by a plasma processing apparatus including a plasma generating unit, a process chamber capable of having an inside pressure thereof reduced, a process gas supply unit for supplying a gas to the process chamber, a specimen table for holding a specimen, a vacuum pumping unit and a cleaning unit, the method comprising the steps of:

performing a cleaning operation in the process chamber under utilization of a plasma for gas for cleaning during processing of a plurality of specimens when the plural specimens are processed one by one in a continuous manner; and

monitoring a temperature of the inner wall after cleaning operation and before starting of the plasma processing for the specimen.

30. A plasma processing method for plasma processing a specimen by a plasma processing apparatus according to claim 29, further comprising the step of setting in advance a temperature of the inner wall corresponding to a plasma processing condition for the specimen.

31. A plasma processing method for plasma processing a specimen by a plasma processing apparatus including a plasma generating unit, a process chamber capable of having an inside pressure thereof reduced, a process gas supply unit for supplying a gas to the process chamber, a specimen table for holding a specimen, a vacuum pumping unit and a monitor unit, the method comprising the steps of:

monitoring a temperature of an inner wall of said process chamber; and

interrupting plasma processing for the specimen in response to the monitored inner wall temperature.

32. A plasma processing method for plasma processing a specimen by a plasma processing apparatus according to claim 31, further comprising the step of setting in advance a temperature of the inner wall corresponding to a plasma processing condition for the specimen.

33. A plasma processing method for plasma processing a specimen by a plasma processing apparatus including a plasma generating unit, a process chamber capable of having an inside pressure thereof reduced, a process gas supply unit for supplying a gas to the process chamber, a specimen table for holding a specimen, a vacuum pumping unit and a monitor unit, the method comprising the steps of:

processing a plurality of specimens one by one in a continuous manner;

performing a cleaning operation in the process chamber under utilization of a plasma of gas for cleaning; and

monitoring a temperature of an inner wall of the process chamber after the cleaning operation and before starting of the plasma processing for the specimen.

34. A plasma processing method for plasma processing a specimen by a plasma processing apparatus according to claim 33, further comprising the step of setting in advance a temperature of the inner wall corresponding to a plasma processing condition for the specimen.

35. A plasma processing method for plasma processing a specimen by a plasma processing apparatus including a plasma generating unit, a process chamber capable of having an inside pressure thereof reduced, a process gas supply unit for supplying a gas to the process chamber, a specimen table for holding a specimen, a vacuum pumping unit and a monitor unit, the method comprising the step of:

monitoring a temperature of the inner wall of said process chamber; and

generating an alarm in response to the monitored temperature.

36. A plasma processing method for plasma processing a specimen by a plasma processing apparatus according to claim 35, further comprising the step of setting in advance a temperature of the inner wall corresponding to a plasma processing condition for the specimen.